

**Adapter for rotary hammer drills**

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An adapter (3, fig 1) for attachment to a rotary hammer action drill 1, comprises means 31 for absorbing the rotary action of the drill and providing an output of purely reciprocal action. Preferably the adapter comprises a body member adapted for attachment to a non-rotary part of a rotary hammer, and a bore extending within the body to receive the rotary part of the drill. Bit means 29 may be provided for insertion into the chuck of the drill, which is locatable within the adapter body so as to transmit the hammer action of the drill while rotating in the bore of the body so that only the hammer action is transmitted to the adapter body. The hammer action may be transmitted from the bit means to the body member and then to a tool 5 secured to the adapter, or the hammer action may be transmitted directly to a tool secured to the body member (see figs 4 and 5).

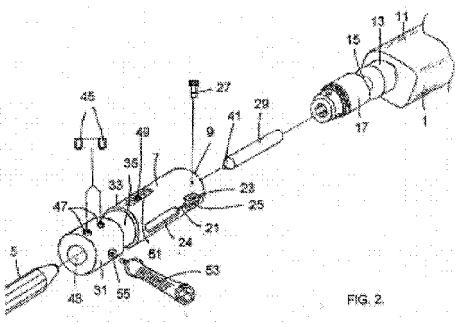


FIG. 2

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(31) 0312178	(32) 28.05.2003	GB 2314287 A                    GB 2181385 A DE 010143090 A                US 4111060 A US 2501542 A                    US 1665173 A
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(54) Abstract Title: **Adapter for rotary hammer drills**

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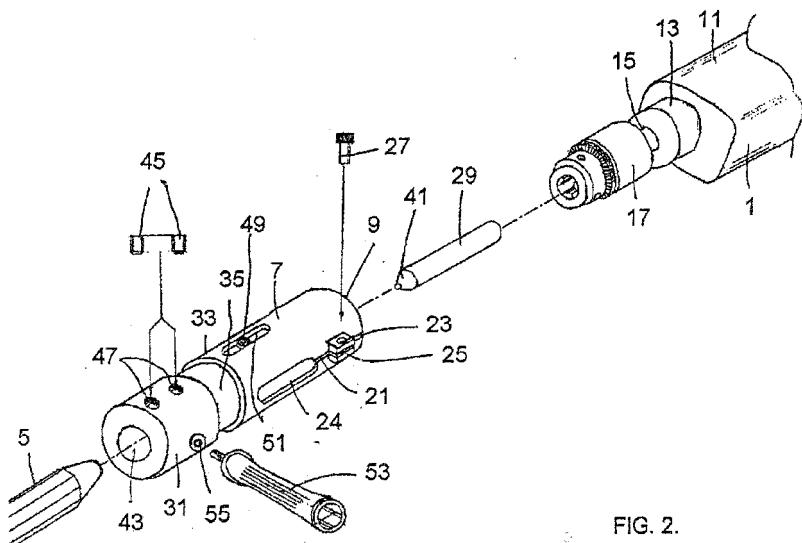


FIG. 2.

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

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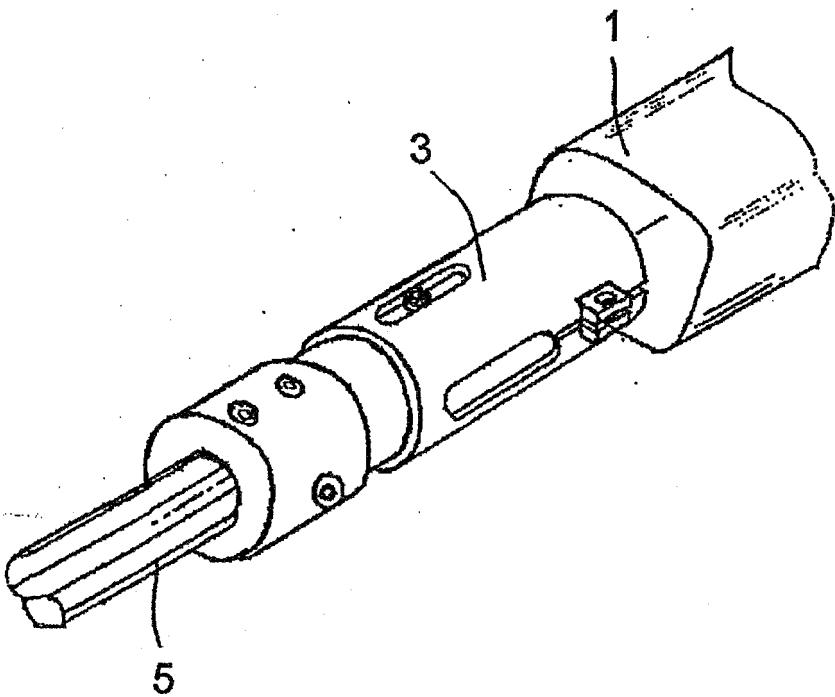


FIG. 1

00 4+ 33

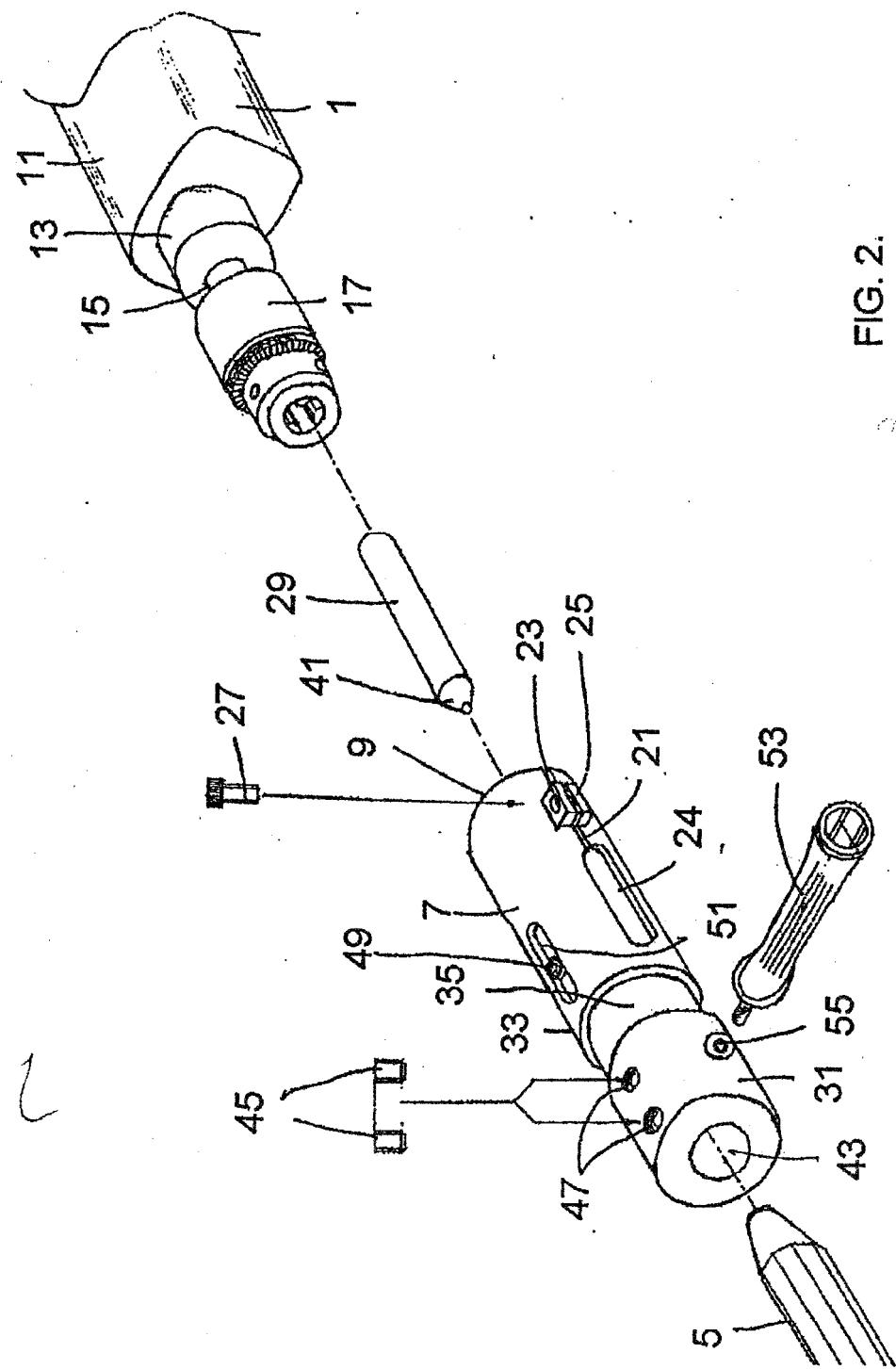


FIG. 2.

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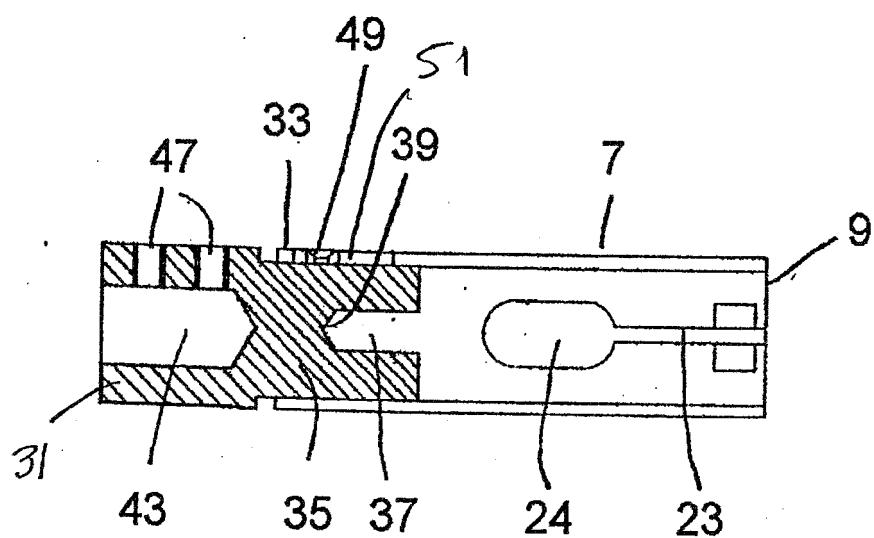


FIG. 3.

00 9+ 33

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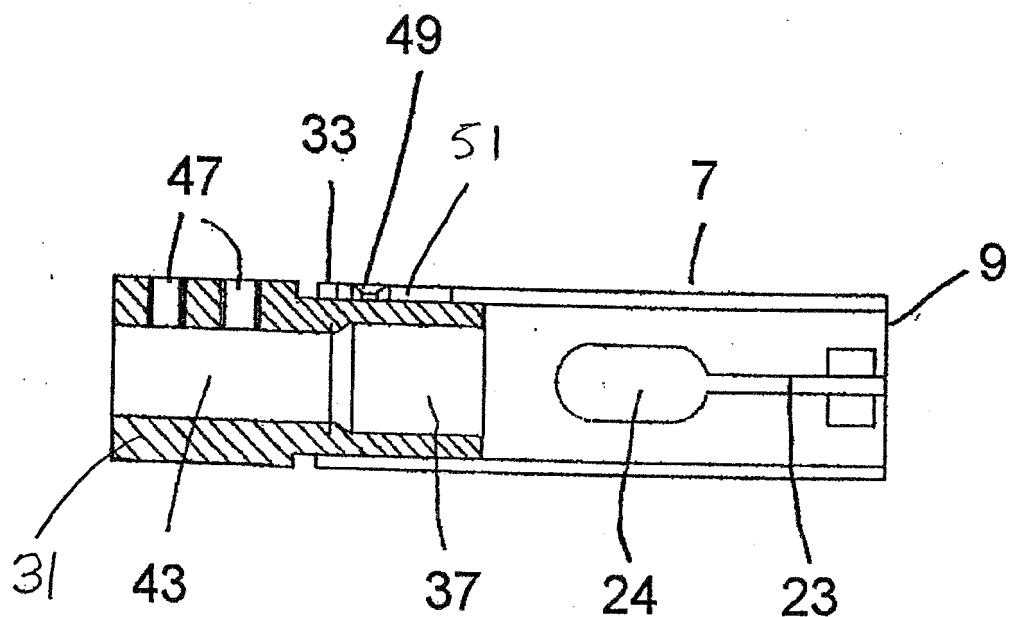


FIG.4.

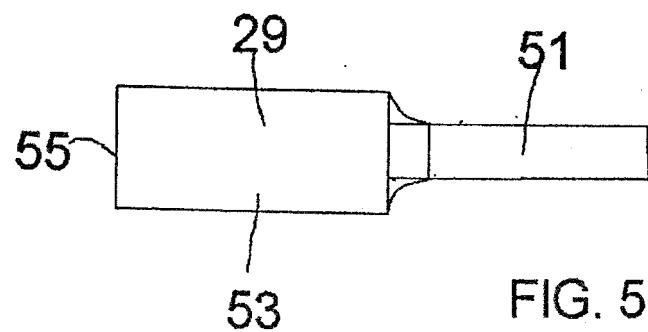


FIG. 5.

20 94 32

## ADAPTER FOR ROTARY HAMMER ACTION DRILLS.

This invention relates to an adapter for a rotary hammer action drill.

There are many times when it is useful to have a relatively high speed mechanical hammer but the cost of such hammers, such as a "Kango", is very high, even when they are hired. A much cheaper type of hammer is a hammer action drill. However, these cannot be used as a hammer since they rotate as well and will therefore drill into the part which is to be hammered.

The present invention seeks to provide an adaptor by means of which a rotary hammer action drill can be used as a non rotary hammer.

According to the invention, there is provided an adapter intended to be attached to a rotary hammer action drill, the adapter having means for absorbing the rotary action of the drill and providing an output of purely reciprocating action.

The adapter preferably comprises a body member adapted for attachment to a non rotary part of a rotary hammer action drill so as to be retained rigidly with the drill, a bore within the body and extending from one end thereof to receive the rotary part of the drill, bit means for insertion into the chuck of the drill and locatable within the adapter body so as to transmit the hammer action of the drill while rotating in the bore of the body so that only the hammer action is transmitted to adapter body.

The hammer action may be transmitted from the bit means to the body member and thence to a tool secured thereto or may be transmitted directly to a tool secured to the body member.

The adapter body may have a second bore at the other end of the body for the insertion of a tool for transmitting the hammer action to a workpiece.

The adapter may comprise a cylindrical sleeve, one end of which fits around a stationary part of a drill, a generally solid cylindrical tool holding body inserted into the other end of the cylindrical sleeve and having an engagement surface on its inner end for engagement with the bit element.

Alternatively, the adapter may comprise a cylindrical sleeve, one end of which fits around a stationary part of a drill, a tool holding body inserted into the other end of the cylindrical sleeve and having a bore arrangement through which the bit element may engage directly on a tool.

The bit element may be consumable.

The tool holding body may be slidable within the sleeve so as to take up wear of the bit element.

The sleeve may be provided with a longitudinal slot which cooperates with a projection extending diametrically from the tool holding body which permits relative longitudinal movement of the sleeve and the transmitter body while preventing any relative rotary movement.

The sleeve may have a longitudinal slit at its end adjacent the drill and means are provided for contracting the slit so as to enable the sleeve to be tightened on the drill.

The invention will now be described in greater detail, by way of example, with reference to the drawings, in which:-

Figure 1 is a perspective view of one embodiment of the invention showing the adaptor set up on a drill and with a tool in place;

Figure 2 is a perspective view similar to figure 1 but with the parts in expanded view;

Figure 3 is a sectional view through the main body of the adapter shown in figures 1 and 2.

Figure 4 is a view similar to figure 3 but showing the construction of a second embodiment of the invention, and

Figure 5 is a view showing an alternative bit element for use in the second embodiment of the invention.

Referring firstly to figure 1, there is shown the end of a rotary hammer drill 1 to which an adapter 3 in accordance with one embodiment of the invention is attached. A tool 5 for use with the adapter 3 is shown protruding therefrom.

The construction of a first embodiment of the adapter is best seen from figures 2 and 3, the first of which shows an exploded view and the second of which shows a sectional view of the main body part.

As can be seen, the adapter 3 comprises three main parts. Firstly there is a cylindrical sleeve 7 of which one end 9 fits around the nose end of the drill 1. Secondly there is an operating bit element 29 and thirdly, there is a tool holding hammer transmitting part 31.

The drill 1 has a stationary part 11 which culminates in a cylindrical boss 13 through which the shaft 15 of the drill projects. The chuck 17 is attached on the end of the drill shaft 15 and is of a slightly smaller diameter than the boss 13.

The end 9 of the cylindrical sleeve 7 passes over the chuck 17 to sit over the boss 13. The sleeve 7 is provided with axially extending slit 21, the inner end of which ends in an enlarged slot 24. On either side of the slit 23 are two aligned apertured projections 23 and 25, the aperture in the latter being threaded. A bolt 27 passes through the aperture in the projection 23 and is screwed into the aperture in the projection 25 so as to contract the dimensions of the end 9 of the sleeve 7 so as to secure it firmly to the boss 13.

A consumable bit element 29 is provided which is secured into the chuck 17 before the sleeve 7 is put in place on the drill 1. It extends into the sleeve 7 in front of the chuck 17 for a purpose to be described hereafter.

Inserted in the other end 33 of the sleeve 7 is the tool holding part 31. This tool holding part 31 comprises a generally solid body portion 35, most of which is located within the sleeve 7. It is formed with a bore 37 to receive the bit element 29. It will be observed that the bore 37 has a pointed end 39 which mates with the correspondingly tapered portion 41 of the bit element 29. At

the other end of the tool holding part 31 is tool receiving bore 43 which receives a tool, part of which is shown at 5, such as a chisel. To secure the tool 5 in the bore 43, two grub screws 45 cooperate with threaded bores 47 which penetrate the bore 43.

The tool holding part 31 is slidingly secured in the sleeve 7 by means of a bolt 49 which runs in a slot 51 in the sleeve 7.

Finally, the tool holding part 31 is provide with a handle 53 which screws into a threaded bore 55 in the transmitter 31.

The operation of the adapter will now be described:-

First the bit element 29 is secured in the chuck 17 of the drill 1. Then the sleeve together with the tool holding part 31 is offered up to the drill so that the bit element 29 and the chuck 17 are pushed into the sleeve 7 with the bit element 29 seated in the bore 37 of the tool holding part 31. the end 9 is pushed onto the boss 13 of the drill and the bolt 27 is tightened to secure the sleeve 7 in place. The handle 53 is assembled to the tool holding part 31 and a tool 5 is inserted in the bore 43 of the tool holding part 31 and secured by the grub screws 47. The adapter is now ready for use.

When the drill 1 is switched on and the tool 5 engaged with a workpiece (not shown) the drill 1 is pushed towards the workpiece. The tool holding part 31 will slide up the sleeve 7 until the end 41 of the bit element 29 engages the base 39 of the bore 37. At this point, the bit element 29 will rotate freely in the bore 37 but will be reciprocating under the action of the hammer action of the drill and will transmit this reciprocation to the tool holding part 31 which in turn will transmit the hammer action to the tool 5.

As the bit element starts to wear under the rotary action of the bit element against the end of the bore 43, the tool holding part 31 will gradually move into the sleeve 7 until the bolt 49 engages the end of the slot 51. At this point it will be necessary to replace the bit element 29 before being again able to use the adapter 3. It will of course be appreciated that the hardness and wear resistance respectively of the bit element 29 and the tool holding part 31 must

be such that wear takes place only on the bit element 29 and that the tool holding part 31 remains unaffected.

Figures 4 and 5 show a different form of cylindrical sleeve and operating bit element for use in a second embodiment of the invention. In this embodiment, the operating bit element is engageable directly with the tool instead of through a transmitting part as in the first embodiment.

Figure 4 shows the cylindrical sleeve 7. However, in this embodiment the tool holding part 31 is constructed differently. The bore 37 is of an enlarged diameter to receive a modified operating bit element 29 of a form which will be described in connection with figure 5 hereafter. The bore 37, in this embodiment is not a closed bore but extends into the tool receiving bore 43 so that the end of the operating drill bit 29 can come into direct engagement with the tool 5. In this case, it is necessary to set the position of the holding part 31 in the sleeve 7 and this is achieved by means of a setting screw or pin (not shown). To this end the sleeve 7 is provided with a radially extending bore which extends into the tool holding part 31 at a position in which the setting screw or pin entered into the setting bore, will define the position in which the holding part 31 takes up in relation to the sleeve 7. Suitably this will be when the bolt 49 is centrally located in the slot 51. Thus, when inserting the tool 5 into the tool receiving bore 43, the tool is pushed into the bore 43 until it engages the bit element 29. The tool 5 is then secured in position using the grub screws 45 in the bores 47. Before use, the setting screw or pin must be removed as otherwise damage to the adapter could result.

The operating drill bit 29 for this embodiment is shown in figure 5. It comprises a stalk part 51 which is inserted into the chuck 17 of the drill 1 and a solid cylindrical part 53 which seats in the bore 37 of the tool holding part 31, the end 55 of this part 53 will engage directly on the end of the tool 5. This will enable full contact with the end of the tool 5 and will tend to reduce the wear on the operating bit element 29 which is also consumable in this embodiment.

It will be noted here that the rotary movement of the operating bit element 29 will be taken up by the end 55 of the operating bit element rotatably rubbing

against the end of the tool 5, which latter is held against rotation so that only the hammer movement is actually transmitted thereto.

It will be appreciated that modifications of and additions to the above described embodiment may be made without departing from the scope of the invention. For example, in order to provide an adapter which will work with designs of drill not having a suitable boss 13, the sleeve may be provided at its end 9 with suitable connection means. The arrangement of the securing of the tool 5 in the transmitter may be carried out in other ways. For example, a chuck like arrangement could be used. The handle 53 could be omitted and the handle usually provided on the drill could be used instead. A quick release connection would be provided between the sleeve 7 and the drill 1 to simplify replacement of the bit element 29.

In the second embodiment, location of the holding part 31 in the sleeve 7 could be carried out by any other suitable means.

**CLAIMS:-**

1. An adapter intended to be attached to a rotary hammer action drill, the adapter having means for absorbing the rotary action of the drill and providing an output of purely reciprocating action.
2. An adapter as claimed in claim 1 comprising a body member adapted for attachment to a non rotary part of a rotary hammer action drill so as to be retained rigidly with the drill, a bore within the body and extending from one end thereof to receive the rotary part of the drill, bit means for insertion into the chuck of the drill and locatable within the adapter body so as to transmit the hammer action of the drill while rotating in the bore of the body so that only the hammer action is transmitted to adapter body.
3. An adapter as claimed in claim 2, wherein the hammer action is transmitted from the bit means to the body member and thence to a tool secured thereto.
4. An adapter as claimed in claim 2, wherein the hammer action is transmitted directly to a tool secured to the body member.
5. An adapter as claimed in claim 2, 3 or 4, wherein the adapter body has a second bore at the other end of the body for the insertion of a tool for transmitting the hammer action to a workpiece.
6. An adapter as claimed in claim 5 when appendent directly or indirectly to claim 2, wherein the adapter comprises a cylindrical sleeve, one end of which fits around a stationary part of a drill, a generally solid cylindrical tool holding body inserted into the other end of the cylindrical sleeve and having an engagement surface on its inner end for engagement with the bit element.
7. An adapter as claimed in claim 5 when appendent directly or indirectly to claim 3, wherein the adapter comprises a cylindrical sleeve, one end of which fits around a stationary part of a drill, a tool holding body inserted into the other end of the cylindrical sleeve and having a bore arrangement through which the bit element may engage directly on a tool.

8. An adapter as claimed in claim 5, 6 or 7, wherein the bit element is consumable.
9. An adapter as claimed in claim 5, 6, 7 or 8, wherein the tool holding body is slidable within the sleeve so as to take up wear of the bit element.
10. An adapter as claimed in claim 9, wherein the sleeve is provided with a longitudinal slot which cooperates with a projection extending diametrically from the tool holding body which permits relative longitudinal movement of the sleeve and the transmitter body while preventing any relative rotary movement.
11. An adapter as claimed in any one of claims 2 to 10, wherein the sleeve has a longitudinal slit at its end adjacent the drill and means are provide for contracting the slit so as to enable the sleeve to be tightened on the drill.
12. An adapter intended to be attached to a rotary hammer action drill substantially as described herein with reference to the drawings.

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Application No: GB 0312798.2  
Claims searched: 1 to 12

Examiner: Gareth Prothero  
Date of search: 29 August 2003

## Patents Act 1977 : Search Report under Section 17

### Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance	
X	1	DE 10143090 A1	(IRLE) See figs, and WPI Abstract Accession No. 2003-344109/33.
X	1	GB 2314287 A	(CRILLY) See figs, and p4 line 1 to p5 line 8.
X	1	GB 2181385 A	(HARRIS) See figs, and p1 lines 39 to 50.
X	1 to 3, 5, 6, 8	US 4111060 A	(NERINI) See figs, and col 4 lines 3 to 20.
X	1 to 3, 5, 6, 8	US 2501542 A	(SHELDON) See figs.
X	1 to 3, 5, 6, 8	US 1665173 A	(MISENER) See whole document.

### Categories:

X Document indicating lack of novelty or inventive step	A Document indicating technological background and/or state of the art
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& Member of the same patent family	E Patent document published on or after, but with priority date earlier than, the filing date of this application.

### Field of Search:

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B4C

Worldwide search of patent documents classified in the following areas of the IPC<sup>C</sup>:

B25D

The following online and other databases have been used in the preparation of this search report:

Online: EPODOC